Thesis/
Reports
Croft,
A. R.

R - INT
INSPECTION
1949 Payette
Forest Fires

3/17/50
INTERMOUNTAIN STATION
Central Reference
No. 8.03

FLOOD AND EROSION HAZARDS

Chief, Forest Service 4/10/50

Reed W. Bailey, Director

R-INT, INSPECTION, 1949 Payette Forest Fires

As requested in your letter of August 16, 1949, we examined the fires on the Payette Forest and are forwarding a report on "Flood and Erosion Hazards."

In reference to your suggestion for installing devices to measure the hydrologic effects of the fires or to establish reference plots, we made basic observations and surveys for future studies. This field work, described in more detail in the accompanying report, consisted of the following observations:

1. 72 photographs of watershed conditions in September 1949 after the fires.

2. 20 camera stations located within the Huntz Gulch fire and 13 stations in the Circle End fire to be used for periodic observation of future watershed conditions.

3. 8 cross-sections of the gully in the headwaters of Huntz Gulch from elevation 3,500 to 4,300 feet. These ranges are staked for future surveys of channel cutting.

4. A detailed topographic map on a 5 ft. contour interval of the debris flow at the mouth of Huntz Gulch. Cross-sections through this fan will permit computation of the amount of sediment removed by the Salmon River in the future.

5. Notes on plant cover and erosion conditions on the Huntz Gulch, Circle End, and older Warren Creek fires.

The installation of stream gages, debris basins, and other measuring devices does not seem warranted in these remote areas. The Circle End fire is inaccessible except in summer over many miles of forest roads out of McCall. These roads are snow-bound from November to June. In addition, this burn was in very rough country reached only by trails from South Fork G. S. or Krassel R. S. The Huntz Gulch burn is near a road, but the Carey Creek grade is not passable in wet weather. Furthermore, Huntz Gulch is so steep that no site for a debris basin could be located, except near the head where the drainage area is very small. Debris storage at the mouth of the canyon would be removed by the main Salmon River in spring floods.

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Another consideration, shown by photos in the accompanying report, is that out of the total acreage of about 8,200 and 14,000 acres burned on Huntz Gulch and Circle End respectively, only a few sections of timber were completely destroyed. Only where the area had burned several times did a serious flood and erosion hazard appear to have been created. Unless struck by unusually heavy summer storms, it did not appear that appreciable runoff or sediment would occur. If mudflows did occur, expensive installations would be required to withstand the force of debris flows. In conclusion, installations on similar burns near Idaho City appears more practical.

GStewart:css

INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION FOREST SERVICE
OGDEN, UTAH

To: The Files Date: 3/17/50

From: A. R. Croft, R. W. Payne, J. M. Rosa

Subject: R-INT, INSPECTION, 1949 Payette Forest Fires

FLOOD AND EROSION HAZARDS

Abstract

During the week September 18-24, 1949, the 1949 Huntz Gulch and Circle End fires on the Payette were inspected to determine the flood and erosion hazard caused by the fires. Also inspected, was the Warren burn of 1937, on the Payette.

The Warren burn of 1937 showed no evidence of runoff or soil erosion except on small localized spots. Presumably, neither surface runoff or sediment have been carried down slopes to Warren Creek in the 12 years since the burn.

The Circle End Fire has created a definite flood and erosion hazard. "Dry" erosion is already occurring. Whether or not floods occur from this area will depend on rainfall intensity during the next 2 or 3 years. By that time invasion of lichens and mosses on the burned soil surface will doubtless prevent rainstorm floods. Very extensive soil disturbance has been caused by winter grazing of deer and elk, although the disturbed soil has not reached the river.

A mud-rock flow, the first in historic times it is believed, occurred from Huntz Gulch about 2 weeks after the burn. This drainage has burned 2 or 3 times before 1949. The present deplorable condition of this watershed is due to cumulative effects of these burns rather than to the 1949 burn alone.

The amount of sediment reaching the Salmon River due to fire is exceedingly minute compared to that caused by placer mining. Excessive grazing is reported to be a factor contributing to sediment in the upper reaches of the South Fork of the Salmon River but this area was not seen by the writers.

cc - Payette
R+L
Floods (Silverstein)
Croft (Mt. files)
Munns (W.O.)

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INTRODUCTION

During the week of September 18-24, the writers inspected some of the fires that occurred on the Payette Forest during August 1949. The purpose of the inspection was to determine (1) the flood hazard and, (2) the soil erosion hazard that may have been caused by these fires.

Most of our time was spent on the Circle End fire on the South Fork of the Salmon River, and on the Huntz Gulch fire about 22 miles up the Salmon River from Riggins, Idaho. The Warm Springs fire, about 9 miles above Riggins was reviewed from the road only. Time did not permit us to look at the Hells Canyon fire on the Snake River. We also spent about a half day on the Warren burn of 1937.

Numerous photographs were taken, some good and some poor. Since we travelled from early morning til late evening, and because time was limited, pictures had to be taken without waiting for satisfactory light conditions. In general the pictures do not differentiate between the 1949 burns and earlier burns, nor do they show the 1949 fire line in old burns. Even though some photographs have these shortcomings, they have all been included in the report because they may have some value in future years.

Warren Burn of 1937

This burn was visited to look for evidence of both surface runoff and erosion that may have occurred during the 12 years since the fire. We found no clear-cut evidence of surface runoff from the slopes or sediment in the channel that had been washed from the slopes, although small localized areas of a few square yards to a few square rods showed both overland flow and soil disturbance.

We inspected the north- and south-facing slopes about a half mile upstream from the Warren Ranger Station. The soil here is podsol-like, developed from granite. It has a profile made up of 2 to 3 inches of very black, highly organic surface soil underlain by a light, yellowish-brown horizon several feet deep (photograph 5). The contrast between the two horizons is very sharp. When undisturbed the top horizon is bound together largely with lichens and mosses, in a somewhat compact and resilient mat-like structure. On many small local areas this mat has been destroyed, by burning of the lichens and mosses. It is on these local patches that overland flow has occurred washing the top soil down slope and exposing the yellowish inorganic horizon.

In general neither lichens, mosses, or seed plants have invaded these spots. This may be associated with a lack of readily available plant food (photograph 3).

Evidence supporting the theory that runoff and sediment from the entire slope has been very minor in 12 years is briefly as follows: (1) Only minor amounts and in some cases no sediment has accumulated behind trees fallen across the slope. (2) A placer mining ditch on the steep south slope, of unknown age, shows no signs of sedimentation from the slopes. (3) Practically no sediment could be found at the toe of either the north- or south-facing slopes, although there has been much disturbance in the bottom of Warren Creek due to placer mining. (4) The slopes themselves show little or no evidence of actual soil removal except on the bare exposed spots and this is confined to a few feet from such spots.

Although the timber stand is just beginning to restock and there are considerable local areas without vegetation, we believe there will be no serious rainstorm runoff or sediment from entire slopes in this vicinity before a complete watershed cover is reestablished unless rainfall intensity and amount are both increased materially over that of the last 12 years. Although rainfall intensities and amounts in the area are not known, they must be relatively light, otherwise some overland flow would have occurred during the 12-year period.

Circle End Burn (South Fork Salmon River)

The Circle End burn has definitely created a rainstorm flood and erosion hazard. Whether either of these occur will depend on rainfall intensity during the next 2 or 3 years, or at least until some cover becomes established on the hot burns.

This burn covered parts of the east and west sides of the South Fork of Salmon River from Circle End Creek down about to Lawman's Ranch, a distance of approximately 5 miles. Considerable of this area burned before 1949, some places probably several times. In addition, most of the East Fork of the South Fork above Circle End Creek has burned one or more times.

Our look at this fire was along a route on the east side of the South Fork of the Salmon River beginning at Lawman's Ranch, south along the trail to Willey's Ranch, across the bridge below Willey's, north along the west side of the river, on and off the trail to Lawman's where we forded to the east side of the river at our starting point. Photograph Nos. 9-14 and 19-27 show views of this burn. In general the burn shown in the photographs at the distant ridge tops occurred prior to 1949.

The Circle End burn will be discussed briefly under the following heads: (1) watershed conditions observed along the coarse of travel, and (2) rainstorm flood potential.

Watershed Condition

Soil on this watershed had been quite noticeably disturbed by heavy grazing and trailing of animals long before the 1949 fire. See photographs 15, 16, 18, and 22. In some places the soil has been pushed downward by trampling, aided by gravity, so that the slopes appear to have been plowed. Use of this area, it is reported, is winter grazing by deer and elk. Although there has been a very limited amount of grazing by livestock belonging to ranchers along the South Fork of Salmon River, the condition observed could not have been caused by them alone for it is too extensive and intensive to have been the result of anything but large concentrated herds.

Since no sediment was found at the toe of the slopes along the South Fork of the Salmon River and because gullies are almost totally absent, we concluded that overland flow sufficient to carry sediment to the stream had not occurred in recent times although considerable downward displacement of soil had occurred.

On our return trip from Willey's to Lawman's along the river edge, we failed to find any sand bars or even small pockets of sand anywhere in the river bed.

On the other hand, about 5 miles upstream, near the confluence of the East Fork of the South Fork with the main stream, the once gravelly bottom of the river is being covered with a coarse granitic sediment. Sources considered to be reliable, report this sedimentation is due largely to grazing and fire, to some extent in the upper reaches of the South Fork of the Salmon and in the East Fork of the South Fork.

Unsatisfactory watershed conditions in addition to those that existed before the 1949 burn were brought about by the fire. Most serious has been burning of the mosses and lichens, which bind the surface soil and prevent it from eroding. This varies from only slight damage in aspen stands to partial or complete destruction where fire was hotest (in general where the fire crowned). As a result local "dry" and "gravitational" erosion are occurring. This dry erosion brings down slides of sand and rocks. The latter created a very definite hazard to men during the fire fighting operations. Both soil streaming and rolling rocks were in progress, on a limited scale, on the days of the inspection. Fortunately such areas are relatively small and it is believed that lichens and mosses will invade the surface soil in a period of 1 to 3 years so that a limited degree of stability will be obtained.

The intense heat that both mosses and lichens endure without death is remarkable. Even on spots where the fire practically consumed all green second growth timber and burned almost every organic particle on the surface, both lichens and mosses could be found alive in tiny pockets and caverns beneath the ash. These, it is believed, will provide a source of spores for quick invasion of the bare soil.

Rainstorm Flood Potential

As has been stated already the Circle End burn of 1949 created a definite rainstorm flood hazard. Whether or not rainfall in the area is of sufficient intensity and amount to cause runoff from conditions produced by the fire is not known. It is probable, however, that rains of 0.5 inch or more with intensities of 2 to 3 inch-hours for 5 minutes could cause considerable overland flow that would reach the river from locally denuded spots within newly burned watersheds. It is possible that rains of this character occur in this area but are infrequent. This theory which is given some credence by conditions on Hall Creek (photograph 27), just opposite Fitzer's Ranch, which has been completely denuded of its timber stand by earlier fires. The channel of Hall Creek, a drainage of about 2,000 acres, appears to be just as natural and undisturbed, with no accelerated channel cutting, as before it was burned. Parts or all of the drainage has burned probably several times in the last 50 years. About four-fifths of it has restocked to shrubs, mainly Ninebark with [illegible] sedges and a few grasses. About one-fifth at the lower part had restocked to timber, which was completely destroyed by the 1949 fire (photograph 14). As near as we were able to ascertain, practically none of the nontimbered part burned. We are not certain whether this was due to natural causes or whether to the construction of a fire line.

Our conclusion from this very quick look at Hall Creek is that although hazardous conditions were created by burns, surface runoff did not occur because of the absence of rainfalls large enough or intense enough to cause overland flow even on the steep slopes. The Hall Creek condition leads us to believe also that if nature is allowed to heal the slopes burned by the Circle End fire without damage by heavy grazing, both flood runoff from the entire slopes and sedimentation in the Salmon River will be practically nil. On the other hand, heavy grazing by either livestock or game that tramples the soil, and prevents growth of lichens, mosses, herbaceous plants, and shrubs may well result in heavy rainstorm runoff, soil erosion, and sedimentation in the Salmon River without an increase in rainfall amount or intensity.

Huntz Gulch Burn

A definite soil erosion, flood runoff, and sedimentation hazard exists on parts of the Huntz Gulch burn as is attested by a mud flow from Huntz Gulch a few weeks after the burn (see attached map and photographs 36 to 44).

We want to caution against the possible assumption that the Huntz Gulch mud flow was an exclusive result of the 1949 burn. This burn was the "last straw" so to speak that let the rain water loose for the Gulch has burned many times and is now almost completely denuded of vegetation. Fire scars on second growth timber that burned in 1949 indicate 4 burns in 50 years, including the 1949 burn.

As a result of this continued devastation by fire, not only the timber is gone, but the organic matter in many places has been completely burned out of the soil, leaving it like brick ash. Many tree stumps and roots have been burned out completely and the once resilient armor-like mat of lichens and mosses that protected the surface from the impact of rain is completely gone.

The alluvial fan at the mouth of the drainage shows 3 periods of mud flow deposition (including the 1949 flow) in the immediate geologic past. The term, "immediate geologic past," connotes a period probably from 2,000 to 20,000 years.

First, there is an old alluvial cone of about 20 acres at the mouth of the canyon which has a rather perched aspect in relation ot the river bed. This is a typical mud flow deposit. The river bed it is believed has been lowered 5 or 10 feet since its deposition.

A second, but much smaller cone, was made, presumably long after the first cone became inactive, by channeling the upstream side of the old cone and depositing huge boulders and other debris in the Salmon River. Although the lower end of the first cone has been sharply truncated by the Salmon River, the second cone is built directly on the river bottom. The boulders are so large they have resisted even the high flow of the stream so that the somewhat bony skeleton of the cone still persists in the river bottom (photographs 39 and 42). The age of this cone is not known, but from the well developed soil on the original slopes of the lower channel, stumps of trees about 200 years of age and lichens on the boulders, the cone could be anywhere from several hundred to several thousand years old.

The mud flow of 1949 which was deposited atop the second cone since the latter was built probably is the first that has occurred since

the second cone was built although freshets have doubtless brought down considerable sediment in the last 20 to 30 years. In addition to about 2 acre feet of sediment deposited along the lower channels and atop cone No. 2, probably an equal amount was dumped into the Salmon River and was washed downstream as indicated by an estimated 5 acre feet of channel erosion on the upper watershed. Rather coarse sediment on the bottom of the stream extending a good way across, suggests that the river may have been almost completely dammed by the flow for a very short period.

Alluvial cones at the mouth of the Long Tom drainage about 3 miles upstream from Huntz shows about the same sedimentation history, except that no historic floods have occurred, even though a part of Long Tom burned in 1949 (photographs 30 to 33). Most of this drainage, however, is still timber covered.

The alluvial cones built by Huntz and Long Tom Creeks indicate a very high runoff and sedimentation potential exists in the area. Although the cause of changes on the watershed that resulted in the two early periods of sedimentation are not known, that of Huntz gulch in 1949 was unmistakably due to numerous fires. Fire could have been the cause of earlier floods also.

The amount and intensity of rainfall that produced the Huntz Gulch mud-rock flow of 1949 is not known. Rainfall of about .46 inch was recorded at Riggins and about 3/4 inch at Studebaker Saddle on the evening of the flow. These facts together with testimony of local residents suggest that total rainfall at Huntz Gulch was probably about 0.5 inch. Nothing is known of the rainfall intensity but from the rills and small gullies on the watershed slopes we estimate a maximum intensity of between 2 and 3 inch-hours for not to exceed 5 minutes. Storms of this amount and intensity produce 10 to 15 percent runoff on bare plots on the Wasatch Front. The maximum recorded rainfall intensity at Lewiston is about 4 inches/hour for 5 minutes and 1.1 inches in 60 minutes for August storms.

Only a miracle of rehabilitation can prevent mud-rock flows from Huntz Gulch for some time to come. Except where roots and organic matter have been completely burned out of the soil, rehabilitation may be reasonably rapid. It is anybody's guess as to when or how the severely burned soils will rehabilitate. One factor in favor of reasonably early recovery is the presence of very dense roots of shrubs, some of which have their crowns undamaged even where burned.

Placer mining sediments

The amount of sediment reaching streams from watershed slopes in that part of the Salmon River visited by the writers is insignificant compared to that being dumped in by even the smallest placer operations. The total placer tailings in the Salmon River drainage, if known, would no doubt stagger the imagination. This sediment will in time constitute a real threat to navigation on the lower Snake River and Columbia River, if, indeed, it is not now a threat. One wonders what destiny holds for a country with such ill-defined objectives that one government agency is straining every nerve to conserve our land and water resources while others condone practices that will in time destroy these resources.

ARCroft:mr

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Photos 1 and 2. General views of the 1937 Warren Creek burn. The pictures were taken looking across Warren Creek towards Mayflower Creek, elev. 6,300 ft. 12:30 p.m. A.R.C. 9/20/49.

Photos 3 and 4. Close-up views of the north-facing slope of Warren Creek burn of 1937, about 300 ft. above the creek bottom. The vegetation is sedge, huckelberry and grass. The original thin humic soil on about 50 percent of the area is undisturbed, being covered with a dense growth of mosses and lichens. The soil on the rest of the area has been eroded. 12:40 p.m. A.R.C. 9/20/49.

Photo 5. Close-up view of the Warren Creek 1937 burn, showing how mosses and lichens bind the thin surface soil together. The surface soil is a thin highly organic mat-like layer 2"-4" deep containing considerable charcoal. This soil condition suggests there has been very little erosion and disturbance since 1937. In places this thin layer has been eroded leaving a light yellow raw soil exposed. Few if any plants grow on it. 12:50 p.m. A.R.C. 9/20/49.

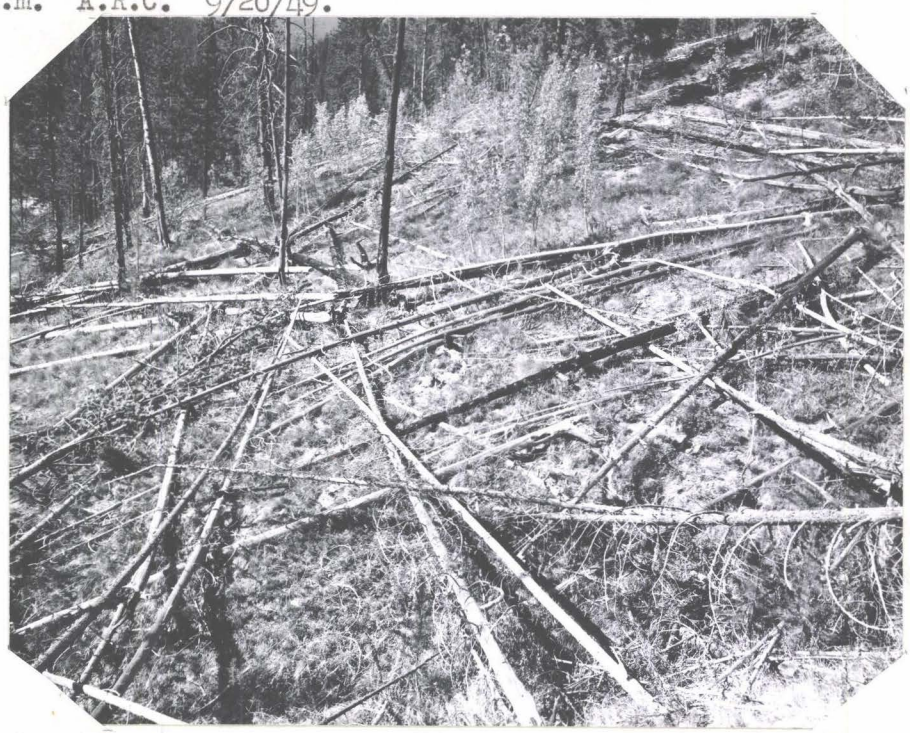
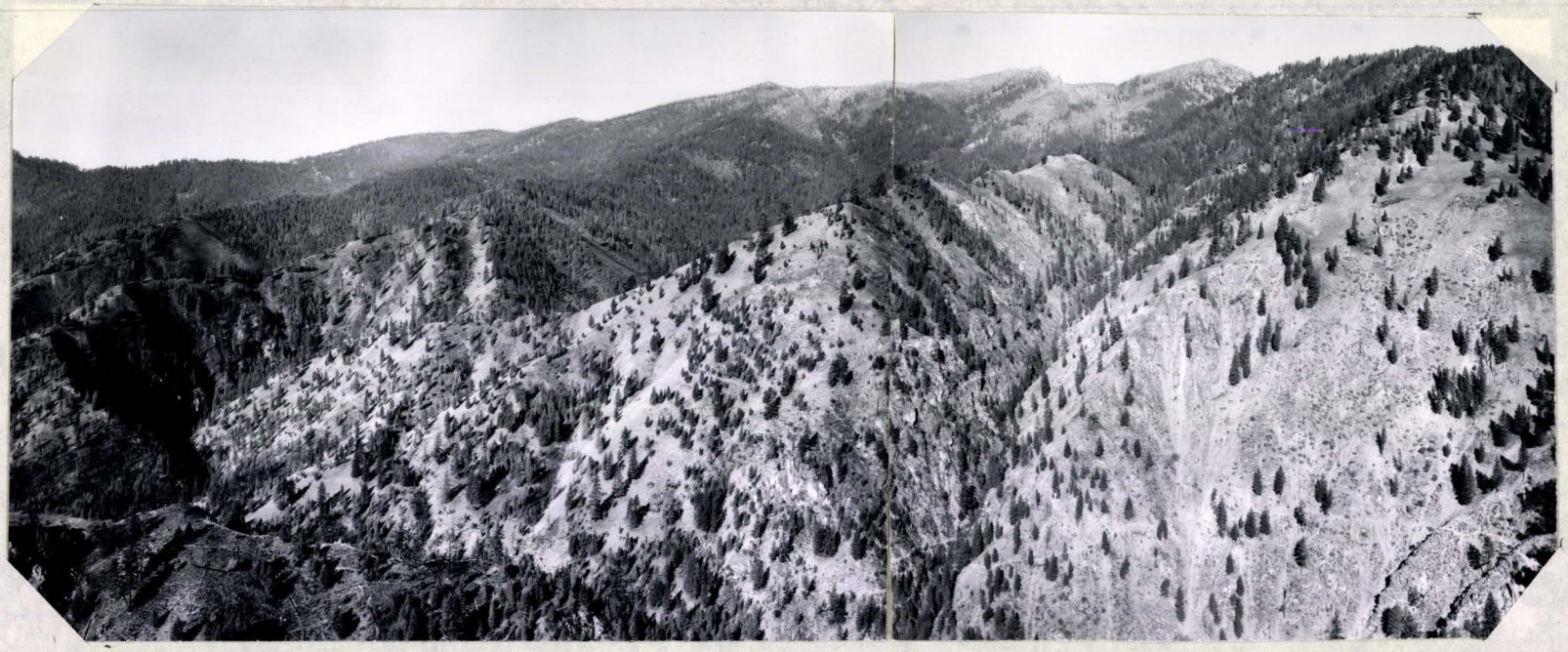


Photo 6. General view of south-facing slope of 1937 Warren Creek burn. The vegetation consists of huckelberry, poa, sedges, lupine with an occasional aspen, strawberry and some lichens and mosses. Small patchy bare spots are common. The elev. is 6,150 ft. Rainstorm runoff from such a surface could probably not occur. 2:50 p.m. A.R.C. 9/20/49.

Photos 7 and 8. North-facing slope of 1937 Warren Creek burn showing natural reforestation of lodgepole pine, elev. 6,200 ft. Litter, logs and sedges, presumably would prevent all but localized overland flow even during intense rains. 2:30 p.m. A.R.C. 9/20/49.

Photos 9, 10 and 11. A panoramic view of the south fork of the Salmon River burn, 1949, taken across river from Bear Creek. Elev. 4,400 ft. The prominent drainage on the right is Bear Creek. The burn on the right foreground of Bear drainage is an old one. It burned again in 1949. In this area the fire was either controlled at, or had a tendency to stop at the edge of unburned timber. A.R.C. 9/21/49.

These are photos II-8-9-10 of the legend — the first taken of the Circle End burn.



Photos 12 and 13. A panoramic view of the South Fork of the Salmon River burn, 1949 looking upstream from the Fritzer Ranch, elev. 4,400 ft. Considerable of the area was burned prior to 1949 fire and there appeared to be a tendency for the 1949 fire to confine itself to the old burns. The burn near the distant ridge top is an old one that did not reburn in 1949. A.R.C. 9/21/49.

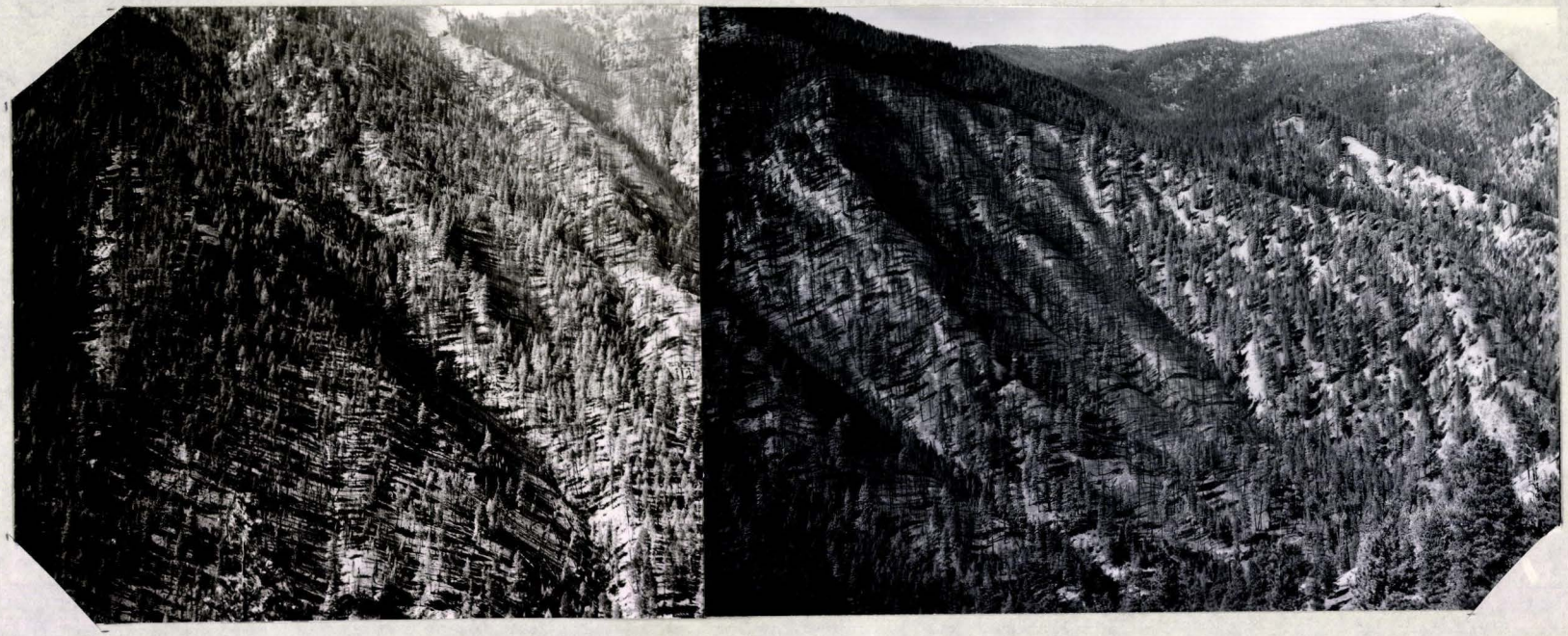
Photo 14. South Fork of Salmon burn, 1949, looking toward Hall Creek. On the left and to the top of the picture is an old burn that has come back to a vigorous stand of brush. About 1/3 of Hall Creek was burned over by the 1949 fire (lower right). 9:30 a.m. A.R.C. 9/21/49.

Photo 15. South Fork of Salmon River burn 1949. Deer trails on Hall Creek in sparce yellow pine stand. The soil movement and disturbance is considerable and excessive soil disturbance has already taken place. This condition can be observed for about two thousand feet above the river on both sides of the canyon. 9:45 a.m. A.R.C. 9/21/49.

Photo 16. South Fork of Salmon River burn 1949. Close-up view of deer trails on a 60 percent slope showing displacement of the soil. Terracing is so deep and wide that the first impression one receives is that the ground has been plowed. There is only slight evidence of overland flow. 10:15 a.m. A.R.C. 9/21/49.

Photo 17. South Fork of the Salmon River burn, 1949, showing the effect of the burn in a young Douglas-fir (?) stand. The mosses, lichens, plant growth, and litter were completely burned from the forest floor, leaving only a very fine powdered ash. 10:30 a.m. A.R.C. 9/21/49.

Photo 18. South Fork of Salmon River burn, 1949. Deer trails in the vicinity of Pidgeon Creek on South Fork of Salmon River, on an 80 percent slope showing soil movement as a result of overgrazing by deer. 11:00 a.m. A.R.C. 9/21/49.



Photos 19 and 20. A panoramic view of part of the South Fork of the Salmon River burn 1949, looking west across the river to an area between Willey Ranch and Tailholt Peak. 12:00 noon. A.R.C. 9/21/49.

Photo 21. South Fork Salmon River burn, 1949. View over Willey Ranch back to the vicinity of Williams Peak to Park Peak. The area from William Peak to Park Peak has been burned over at an early date and is coming back to brush and a few pines. (Not visible in photo.) 12:00 noon. A.R.C. 9/21/49.

Photo 22. South Fork of Salmon River burn, 1949. Deer trails on the east slope of the South Fork of the Salmon River, just east of Willey Ranch. Such consentrated trails are characteristic on east slope. 12:30 p.m. A.R.C. 9/21/49.

Photo 23. On Salmon River burn of 1949, this 80 percent slope of a burned-over Douglas-fir stand, dry erosion has started to rapidly move the soil down the slope. This condition is typical wherever the fire was hot enough to destroy lichens, mosses and litter. 2:00 p.m. A.R.C. 9/21/49.

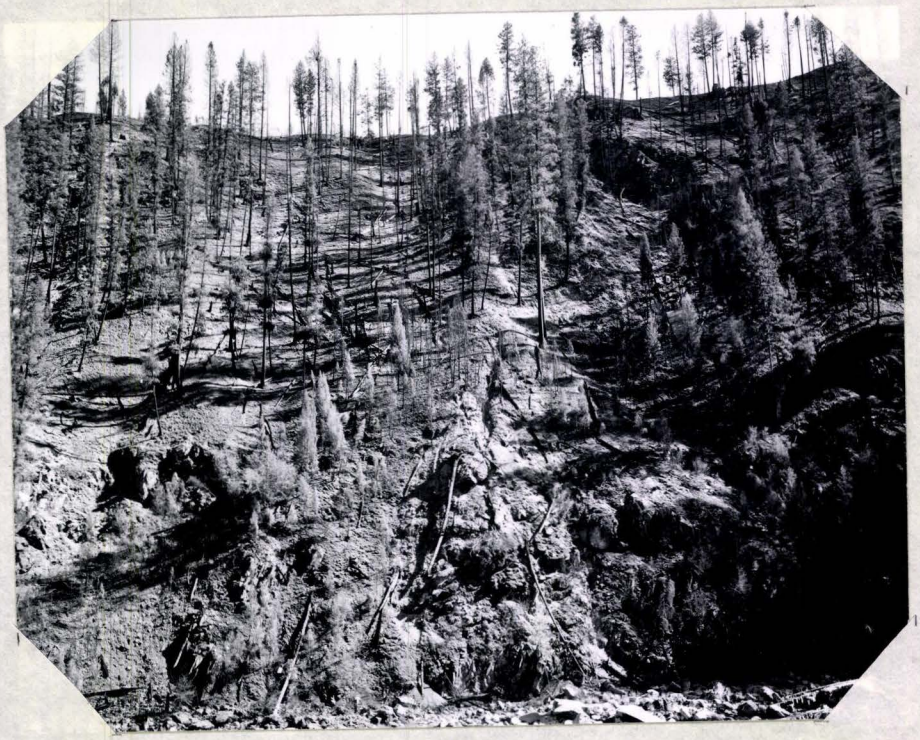


Photo 24. South Fork of Salmon burn. Burned-over Douglas-fir stand on a 80 percent slope. Here dry erosion is marked on the entire area. The picture was taken from west bank of river at Pidgeon Creek looking across to the east slope. 2:30 p.m. A.R.C. 9/21/49.

Photo 25. South Fork of the Salmon River burn of 1949, from Bear Creek point looking across to the north slope of Bear Creek. The burn shown is an old one. The fire of 1949 reburned the area and stopped roughly at the margin of the unburned timber. 11:00 a.m. A.R.C. 9/22/49.

Photo 26. South Fork of Salmon River burn 1949. The north slope of Bear Creek showing an old burn prior to 1949. Note that there is no visible gullying as a result of the previous burn. The 1949 burn did not cover this old burn. 11:45 a.m. A.R.C. 9/22/49.

Photo 27. South Fork of the Salmon River burn 1949. From Bear Creek point looking across to Salvage point on Hall Creek. Practically all of upper Hall Creek drainage (left background) burned prior to 1949. The main stream channel is not gullied. 11:30 a.m. A.R.C. 9/22/49.

Photo IV - of 7 the legend - the last photo taken of the Circle End burn.

Photo 28. From top of the west ridge of Huntz Gulch, looking toward Carey Creek--1949 burn. This was chiefly a surface burn, in grasses and shrubs. Trees were burned in a previous fire. 6:00 p.m. A.R.C. 9/22/49.

Photo 29. Huntz Gulch burn of 1949. "Dry erosion" starts on the steep slopes when the mosses and lichens are burned to mineral soil, (center). The fire destroys all the mechanical support of the soil. The partly burned mosses and lichens on either side of eroded area are able to still cover and support the soil. 11:20 a.m. A.R.C. 9/22/49.

W.O. 46071

Photo 30. Inactive alluvial fan at the mouth of Long Tom Creek on the Salmon River. There are several of these large alluvial fans along the Salmon River. Part of Long Tom drainage burned in 1949 but no floods occurred. 11:15 a.m. A.R.C. 9/23/49.

460672

Photo 31. Huntz Gulch burn of 1949. Huge boulders in the alluvial cone at the mouth of Long Tom Creek. They indicate the great potential for erosion in the drainage. Trees of great age on this cone indicate that no floods have come from this drainage in several hundred years for certain and probably for a very much longer period. 11:45 a.m. A.R.C. 9/23/49.

460673

Photo 32. Huntz Gulch burn of 1949, Long Tom Creek--up stream 20 ft. from the Salmon River. The water is clear and there is no fresh sediment in the creek bottom, even though part of the drainage burned in 1949. 11:45 a.m. A.R.C. 9/23/49.

460674

Photo 33. Huntz Gulch burn of 1949. Miners cabin on inactive alluvial cone at the mouth of Long Tom Creek, which enters the Salmon River from the right. 12:00 noon. A.R.C. 9/23/49.

460675

Photo 34. Huntz Gulch burn of 1949. Front of inactive alluvial cone at Long Tom Creek. It has been several hundred years since any material amount of sediment has been deposited on this cone. 11:60 a.m. A.R.C. 9/23/49.

460676

Photo 35. Huntz Gulch burn of 1949. The loose mineral soil was exposed by the almost complete burning of mosses and lichens and a few grasses and shrubs. This area is a source of "dry erosion." 12:30 p.m. A.R.C. 9/23/49.

460677

Photo 36. Mud flow that came out of Huntz Gulch burn of 1949 and into the Salmon River. The mud flow pushed the river against the north bank and doubtless for a very short time checked the entire flow. 12:30 p.m. A.R.C. 9/23/49.

460678

Photo 37. View of mud flow from Huntz Gulch, showing how the mud and logs blockaded the road along the Salmon River. The flow consisted of dark coarse organic sandy loam with large rocks and numerous logs. 12:45 p.m. A.R.C. 9/23/49.

460679

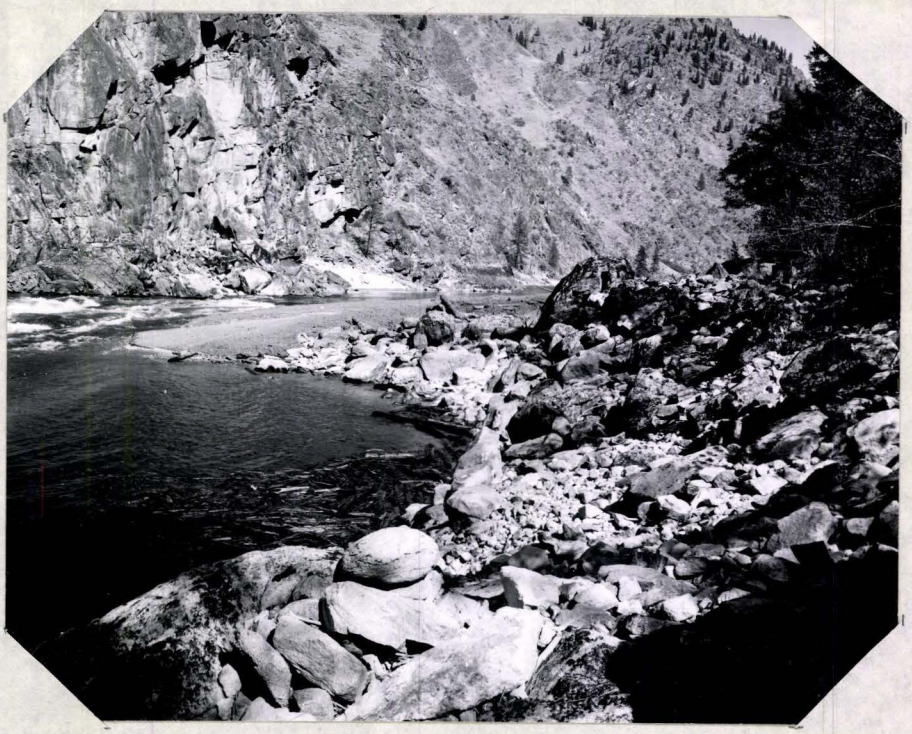
Photo 38. Looking up Huntz Gulch from the road, showing part of the mud flow that followed the 1949 burn and a gentle rain storm about a week later. 12:45 p.m. A.R.C. 9/23/49.

460680

Photo 39. A general view of the Huntz Gulch mud flow from the road, looking down to the Salmon River 12:50 p.m. A.R.C. 9/23/49.

460681

Photo 40. Mud flow that came down out of Huntz Gulch after the 1949 burn. The picture was taken on the road and looking up Salmon River. 12:45 p.m. A.R.C. 9/23/49



460682

Photo 41. The end of old alluvial fan at Huntz Gulch and the end of the 1949 mud flow (left center). 12:40 p.m. A.R. C. 9/23/49.

460683

Photo 42. Contact of mud flow out of Huntz Gulch 1949, and "alluvial fan number two" at the mouth of the gulch. 12:50 p.m. A.R.C. 9/23/49.

460702

460703

Photos 43 and 44. Channeling after Huntz Gulch burn of 1949 at 1,000 ft. (No. 43) and 1,500 ft. (NO. 44) above the Salmon River road. Upstream to the head of the gulch the channel gets extremely deep with vertical cliffs. Deepening of the channel produced most of the mudflow sediment. 4:00 p.m. A.R.C. 9/24/49.

460704

Photo 45. Huntz Gulch fire, 1949. It shows the charred brush stumps which have already put out new growth at the base of the stumps. When the roots were not killed this new growth came back very quickly along with a few grasses. New growth is hard to see because of minute size of leaves. (11/25/49) 10:00 a.m. A.R.C. 9/24/49.

460707

Photo 46. General view of south- west-facing slope looking across Huntz Gulch, after burn of 1949. 10:30 a.m. A.R.C. 9/24/49.

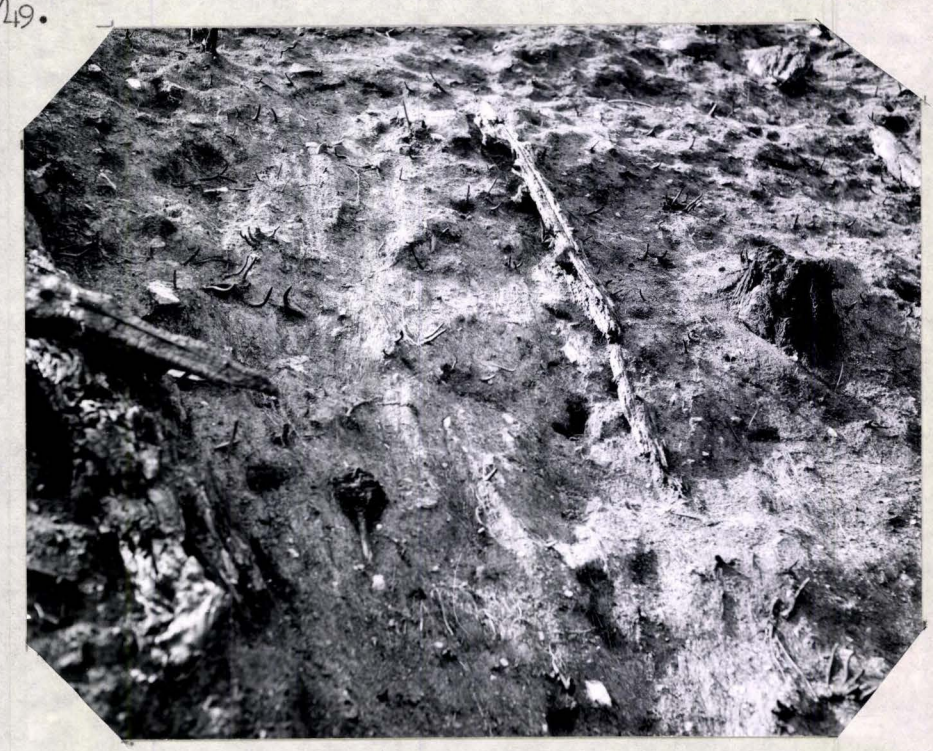
460705

460706

Photos 47 and 48. Huntz Gulch after the fire of 1949, showing the condition of vegetation. There was a quick regrowth of grasses and broad leaf trees, even on lands such as this, where the fire was hot enough to burn the organic matter out of the soil for a depth of several inches. 10:10 a.m. A. R. C. 9/24/49.

460708

Photo 49. Huntz Gulch burn of 1949, looking east along the south side of canyon. The fire burned very hot in this area which had been burned over several times before. As it reached the edge of virgin timber (?) it was either controlled or died out. 11:00 a.m. A.R.C. 9/24/49.



460709

Photo 50. Huntz Gulch fire 1949. The fiberous root system still left by the burn helps hold the soil in place during overland flow of water which occurred on this area from about .5 inch of rain about 2 weeks after the burn. Organic matter in surface inch of soil has been completely burned. (The great mass of small fiberous root ends do not show very good in this photo.) A.R.C. 9/24/49.

460710

Photo 51. General view of the head of Huntz Gulch after burn of 1949. Part or all of this area has been burned over several times since the turn of the century as evidenced by fire scars on trees. 11:15 a.m. A.R.C. 9/24/49.

460711

Photo 52. Huntz Gulch burn of 1949. This sterile, stony soil is being held in place by the fiberous root system of plants whose tops were completely destroyed. Slope is about 100 percent. 11:30 a.m. A.R.C. 9/24/49

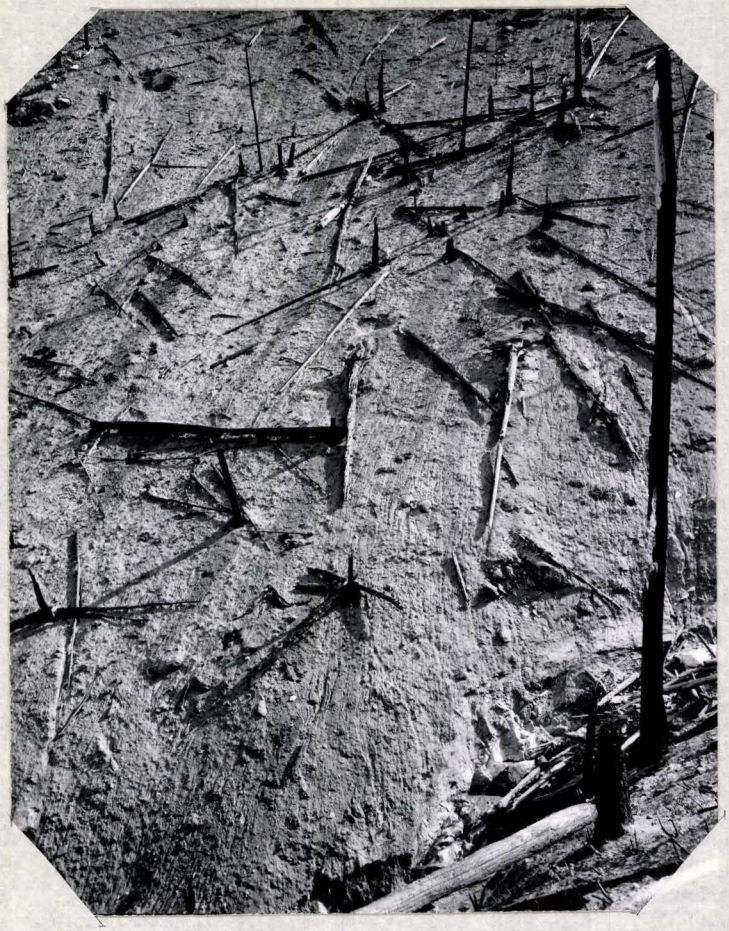
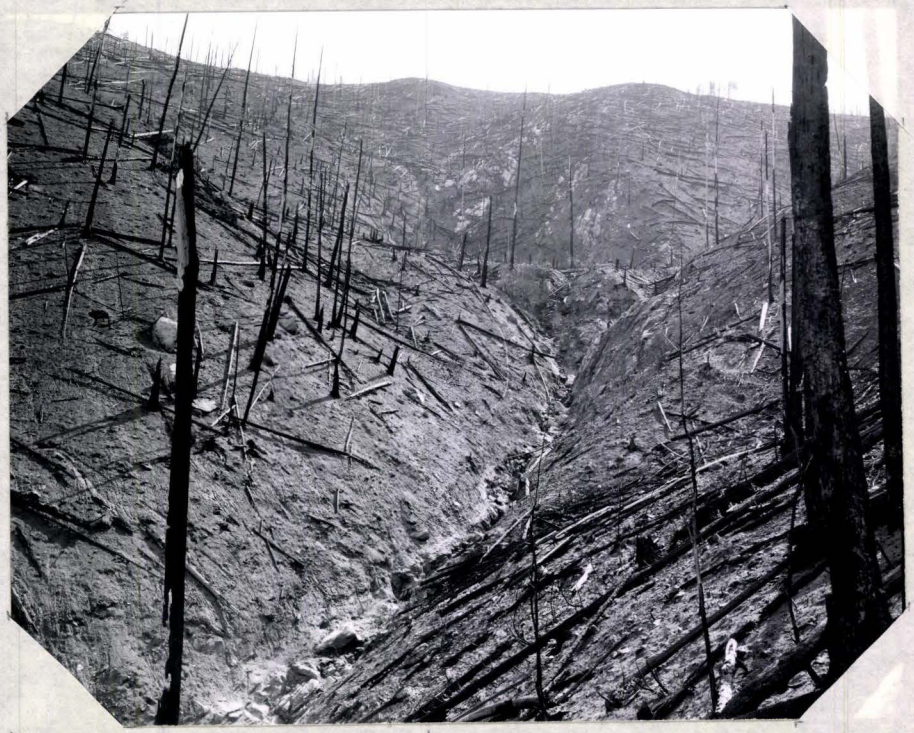


Photo 53. Rills left on the steep slope after the Huntz Gulch burn of 1949, as a result of the first gentle rainstorm of about .5 inch. Mosses of fiberous roots, not visible in the photo, prevented deeper cutting. 11:30 a.m. A.R.C. 9/24/49.

460712



460713.

Photo 54. Huntz Gulch burn of 1949. As one travels down the gulch the main gully becomes 20 ft. wide and 5 to 30 ft. deep. Most of this cutting results from a .5 inch rain soon after the burn. 11:30 a.m. A.R.C. 9/24/49.

460684

Photo 55. Gully in the right fork of Huntz Gulch. This picture was taken near the head of the gulch after the fire of 1949 and at a point where channel erosion started. 11:45 a.m. A.R.C. 9/23/49.

460685

Photo 56. Gullies and rills in the left fork of Huntz Gulch. This picture was taken at head of the gulch showing the only possible site for a debris basin. 11:45 a.m. A.R.C. 9/23/49.

460686

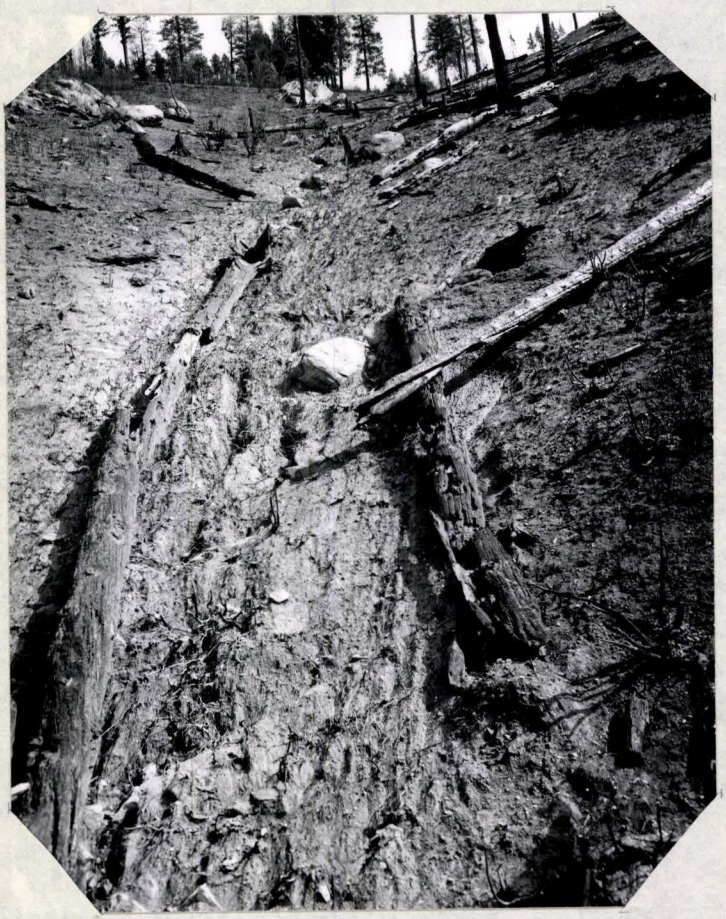
Photo 57. Huntz Gulch fire of 1949. Small drainage at head of Huntz Gulch showing the scoured surface caused by runoff (foreground). Down this small slope come large stumps as a result of the runoff. Only minor channeling occurred. 12:00 noon. A.R.C. 9/23/49.

460687

Photo 58. Huntz Gulch fire of 1949. Possible debris basin site of head of Huntz Gulch. 12:00 noon. A.R.C. 9/23/49.

460688

Photo 59. Huntz Gulch fire of 1949. General view down Huntz Gulch from a point near the debris basin site. A.R.C. 9/23/49.



460689

Photo 60. Huntz Gulch fire of 1949. On this steep slope the shrub and grass roots help to prevent gullying during surface runoff. Very heavy runoff came down this draw. 1:00 p.m. A.R.C. 9/23/49.

460690

460691

Photos 61 and 62. An aged open yellow pine stand after the Huntz Gulch fire of 1949. Dead pine needles cover the charred ground surface. The fire did not crown here but all leaves were killed. 1:10 p.m. A.R.C. 9/23/49.

460692

Photo 63. North-facing slope of Huntz Gulch after the fire of 1949. 1:30 p.m. A.R.C. 9/23/49.

Photo 64. Huntz Gulch burn of 1949. Roots holding the soil in a gully just above a sandy cone about 1,000 ft. downstream from debris basin site. 2:00 p.m. A.R.C. 9/23/49.

460693

460695

Photo 65. Huntz Gulch fire of 1949. General view of the gully downstream near the sandy alluvial cone, (about 1,000 feet downstream from debris basin site). At this point cross section No. 2 was taken. 2:10 p.m. A.R.C. 9/23/49.

460694

Photo 66. A general view looking up Huntz Gulch, burn of 1949. Cross section No. 2 was taken at this camera point. 2:15 p.m. A.R.C. 9/23/49.

460696

460698

Photos 67 and 68. Sand bars on the Salmon River in the vicinity of Carey Creek and Studebaker Saddle. There are numerous bars like these from Riggins to Huntz Gulch. 3:00 p.m. A.R.C. 9/23/49.

460697

Photo 69. One of several small drainages in the vicinity of Studebaker Saddle that produced mudflows. 3:05 p.m. A.R.C. 9/23/49.

460699.

Photo 70. Huntz Gulch burn of 1949. Fire was carried over the steep rocky places such as these by the dry moss on the rocks. 3:30 p.m. A.R.C. 9/23/49.

460700.

Photo 71. Huntz Gulch fire 1949. Moss that grows on a thin layer of soil or even bare rock when dried is a very effective means of carrying fire. 3:30 p.m. A.R.C. 9/23/49.

460701

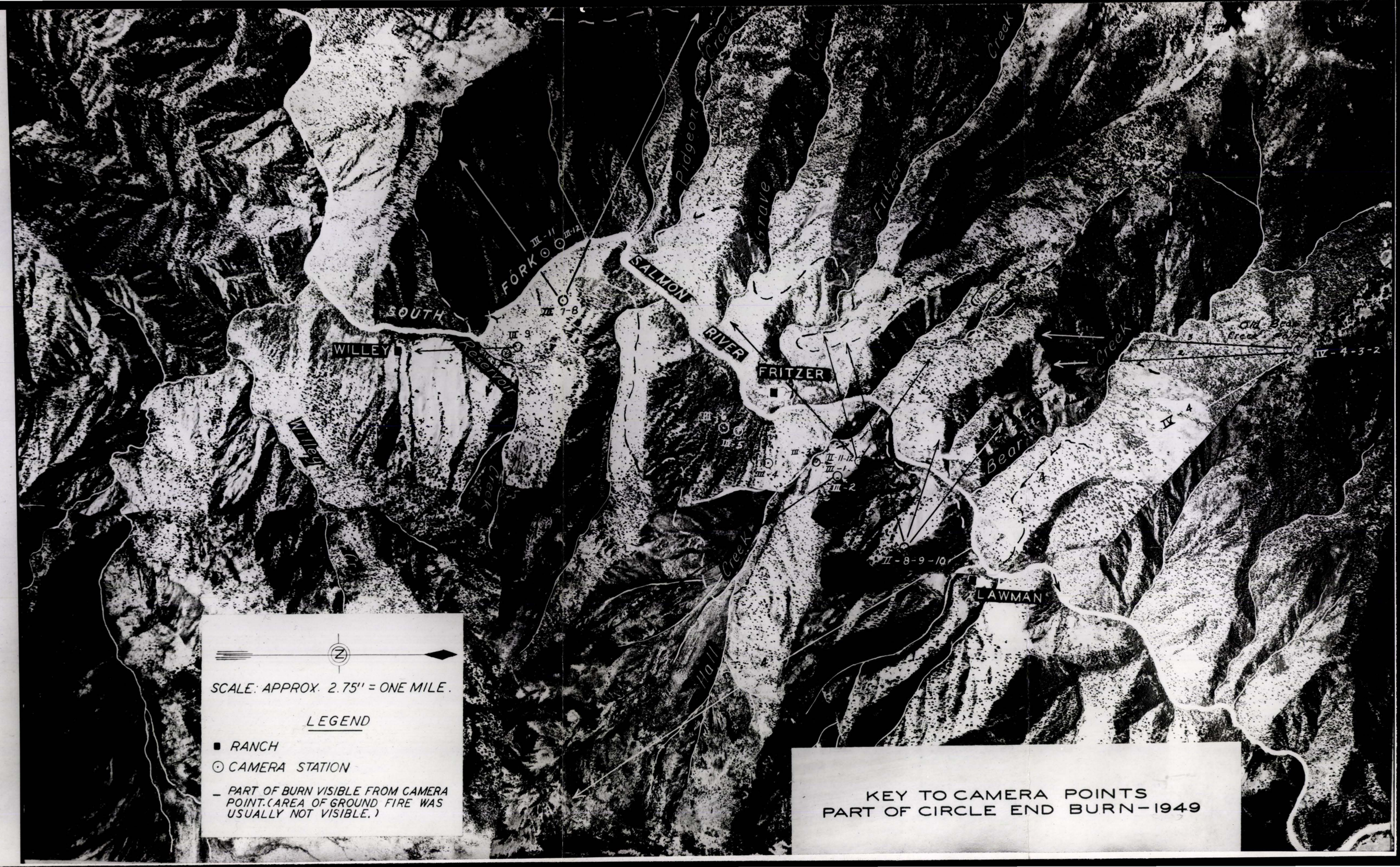
Photo 72. A general view of the area around French Creek showing reforested brush, after an old burn. 3:40 p.m. A.R.C. 9/23/49.

LEGEND

⊙ CAMERA STATION

SCALE: 2½=1 MILE (APPROXIMATE.)

KEY TO CAMERA STATIONS
HUNTZ GULCH BURN 1949


SOUTH FORK
SALMON RIVER
Pidgeon Creek
Grave Creek
Fritzer Creek
Bear Creek
Old Bear Creek Road
Wiley Creek
Hall Creek
WILLEY
FRITZER
LAWMAN
III-11
III-12
III-7-8
III-9
III-5
III-4
III-11-12
III-1
III-2
II-8-9-10
IV-4-3-2
IV-4
SCALE: APPROX. 2.75" = ONE MILE.
LEGEND
■ RANCH
⊙ CAMERA STATION
– PART OF BURN VISIBLE FROM CAMERA POINT. (AREA OF GROUND FIRE WAS USUALLY NOT VISIBLE.)
KEY TO CAMERA POINTS
PART OF CIRCLE END BURN–1949

LEGEND

A1——A2 CROSS SECTION

STATION

B.M.

DEBRIS FLOW

TRUE

MAGNETIC

20°30' E

TO FRENCH CREEK

APPROXIMATE HIGHWATER LINE SALMON RIVER

SALMON RIVER

DEBRIS FLOW

HUNTZ GULCH

DEBRIS FLOW

ROAD

B.M. 1780.0

A-1 A-2 B-1 B-2 C-1 C-2 D-1 D-2 E-1 E-2 F-1 F-2 G-1 G-2

A B D E

15 17.5 20 25 50 75 85 90

MAP OF DEBRIS FLOW HUNTZ GULCH - SALMON RIVER

NEAR RIGGINS, IDAHO

SEPTEMBER 1949

SCALE 1"=100 FEET